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THE NEW BUILDING FOR THE INSTITUTE OF ZOOPHYSIOLOGY UNIVERSITY OF UPPSALA

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THE NEW BUILDING FOR THE INSTITUTE OF ZOOPHYSIOLOGY, UNIVERSITY OF UPPSALA

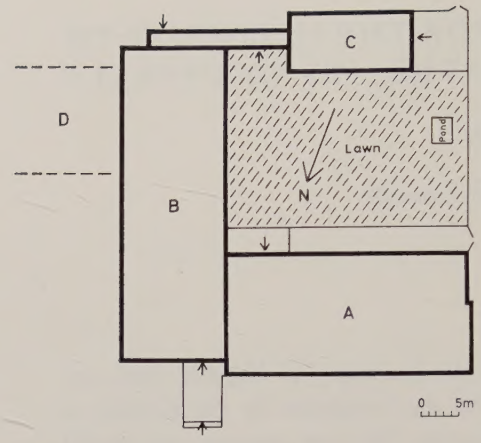
by

Per Eric Lindahl

The Institute of Zoophysiology at the University of Uppsala came into existence in 1946 simultaneously with the foundation by the *Riksdag* of a chair in zoophysiology at the university. The new institute was housed in the north part of the basement in the building of the Zoological Institute. From the beginning three rooms—among these a large class-room—were available, being partly sub-divided by light walls into smaller units. Some apparatus were purchased with a grant from the Government, and addition of some further equipment was soon made possible by financial aid of the Rockefeller Foundation. A small mechanical workshop was set up in 1948.

As the number of post-graduate students increased, some rooms on the same floor but in the south part of the building were by degrees made available for the Institute of Zoophysiology. Nevertheless, in 1950/51 it became necessary to bring about a doubling of the space of the Institute by reconstructing and furnishing, among others, a caretaker's flat. The possibilities of doing research work were considerably increased by the construction in 1952 of a provisional wooden animal house for joint use by the two institutes.

In 1953 zoophysiology was admitted as subject of graduate examination for the degree of *filosofie licentiat*. Before this it could be studied only within the frame of zoology, where it still constitutes a special part of the course for the degrees of *filosofie kandidat* and *filosofie magister*. The newly established subject with its highly diversified types of problems and strong attachment to practical questions attracted a rapidly growing group of post-graduate research workers. The steadily increasing number of students wanting to study zoology for the degree of *filosofie magister* but being rejected because of lack of premises, and the clearly foreseen avalanche-like rush of students to the universities, now being fully developed, were further weighty reasons for the planning of a new building.



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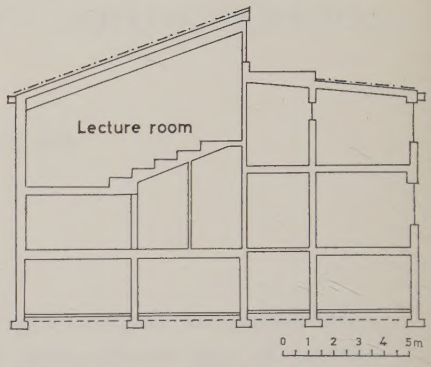

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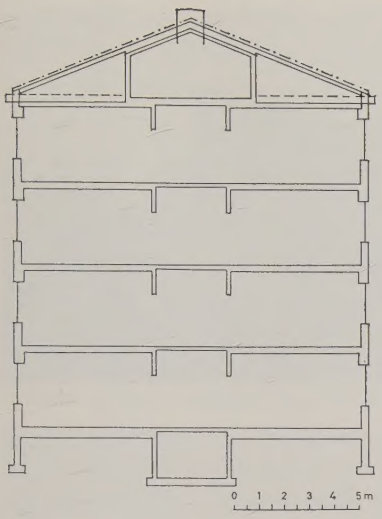
Fig. 1. Diagram of arrangements of blocks.
Fig. 2. Section of Block A (cf. Plates 1–3, section A–A).

PLANNING FOR A NEW BUILDING

The needs for a new building for the Institute of Zoophysiology was already mentioned in 1948 in the University's general plan. In its sixth report in 1951 the Committee for planning of universities of 1945 states that it is "inevitable that a separate building is constructed for the Institute of Zoophysiology as soon as possible". At the request of the Committee the present author had an estimate of cost made by the National Board of Building and Town Planning, and provisional drawings were produced by the Board in 1954. The architectural design was then entrusted to the architect P. O. Olsson, Stockholm, assisted by Mr. Gunnar Andersson, and the detailed planning of the building proceeded in close and fruitful co-operation until after some different proposals the final drawings were approved in 1958. During all the planning, construction, and equipping of the building the present author was assisted in a most able way by the research assistants, to start with fil. kand. Lars-Erik Sundell and after 1957 fil. kand. Nils-Olov Bodin.

The mutual position of the blocks constituting the building appears from Fig. 1. They surround a grass-covered area of ground intended for a small pond and for caging of animals which must not be kept indoors. In order to be able to protect these from disturbances the lawn is fenced off by a high wooden enclosure, leaving admittance only to the unloading-platform at



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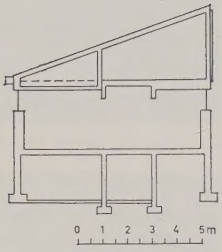

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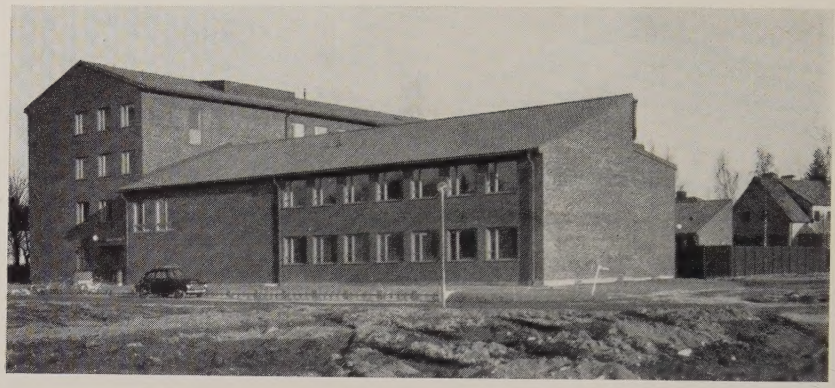
Fig. 3. Section of Block B (cf. Plates 2–4, section B–B).
Fig. 4. Section of Block C (cf. Plates 1–2, section C–C).

the back of Block A. The basement of this block (Fig. 2) is occupied by technical rooms, shelter, and a store-room for keeping great numbers of living fish. The ground-floor of Block A chiefly contains workshops and stores, whereas its first floor houses the teaching premises consisting of lecture room, class-room with subsidiary localities, and seminar room. Block B (Fig. 3) which lacks a basement is used exclusively for research and research-training. Its ground-floor contains laboratories for special purposes, whereas its three upper floors are occupied chiefly by research laboratories. Block C (Fig. 4), the animal-section of the Institute, is connected with the ground-floor of Block B by a covered passage. The appearance of the building is shown in Fig. 5.

The construction work was carried out by the National Board of Building and Town Planning and was begun in the late autumn 1958. The building was constructed of brick with a tiled roof. It was taken into use during summer 1961.

The total floor area including passages, staircases, walls, toilets etc. is estimated by the Board of Building and Town Planning to 4697 m^2. This figure includes also a non-existing floor below the ground-floor in block B. A more realistic estimation gives 4097 m^2. The net surface amounts to 2341.2 and is distributed upon blocks and floors as seen in Tables 1–3



a

b

Fig. 5. The Institute of Zoophysiology, *a* from the west, *b* from the south-west.

to which the Nos. of the rooms in the text refer. For the purpose of comparison it may be stated that the surface of the premises occupied by the Institute of Zoophysiology in the building of the Zoological Institute amounted to 116 m^2.

DESCRIPTION OF THE BUILDING

GENERAL DISPOSITION

In order to facilitate the full exploitation of rooms and equipment available the Institute is organized as one unit.

The general arrangement of the localities has been determined chiefly by the following desiderata: (1) The section for teaching must be well

separated from that for research and research-training, although entrance and stairs should be used in common. (2) The section for research and research-training must not be in direct connection with workshops and animal section, as vibrations, noise, and odours might otherwise disturb the research activity. (3) The stores for general supplies should have a rather central position. (4) The goods reception must be situated close to the workshops and the stores for general supplies. (5) The radioactive store and radiochemistry laboratory should preferably be situated in the basement or on the ground-floor. These wants have been met by housing the section for teaching in a block different from that housing the research and by letting the main staircase well of the building act as communication. The animal section is placed at a distance in Block C connected with the section for research by a covered passage. By locating the stores for general supplies in the ground-floor of Block A close to the research section this becomes screened off from the workshops which together with the stores mentioned are gathered around the goods reception.

A future addition to the building is marked as Block D in Fig. 1. With this localization of Block D the minor staircase of Block B will have a rather central position (see Figs. 7–9). The vertical communication is further facilitated by a lift, in the first place intended for apparatus and supply, with a capacity of 1000 kg. Unfortunately, on account of the qualities of the ground, the lift does not extend down to the level of the basement of Block A.

From the entrance hall (No. 101) the ground-floor of Block A is reached by the passage of Block B and a short connecting passage south of the main staircase (Fig. 7). Further, the entrance-hall communicates with the purchase-office (No. 177 on the ground-floor of Block A) which thus serves as a kind of reception.

A part of the building situated between the minor staircase well and the southern gable of Block B, and extending through its four storeys, has been made vibration-proof by being constructed of bricks only and isolated from the rest of the house (shaded in Figs. 6–9). Here balances and other instruments sensitive to vibrations are mounted, and some laboratories provided with vibration-proof supports are located here.

The light transverse walls dividing up Block B on either side of the passages into small units have in some places been left without pipes and may easily be removed, if larger rooms should become desirable for special purposes.

The building is heated with hot water supplied by the heating installation

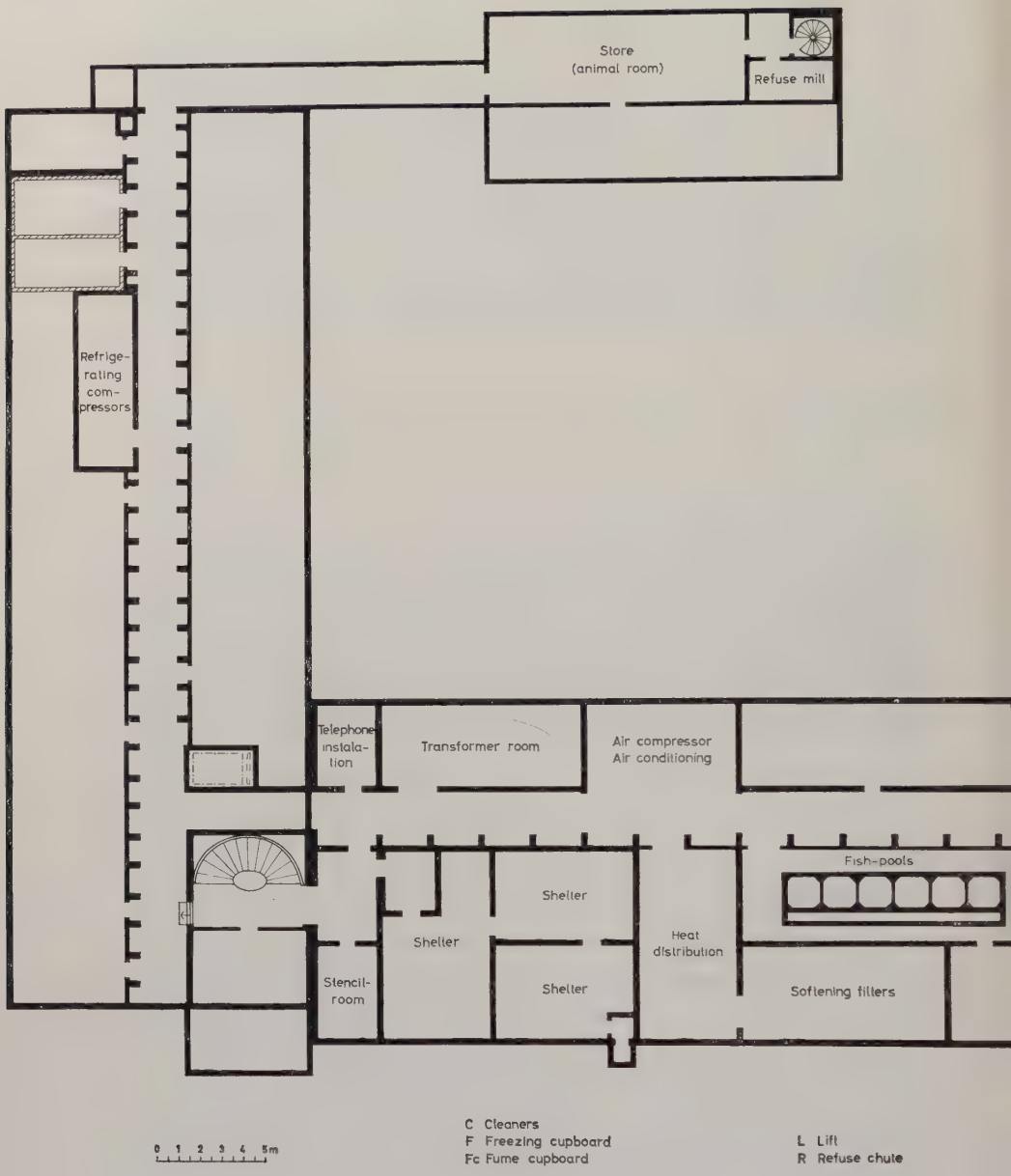


Fig. 6. Plan of basement.

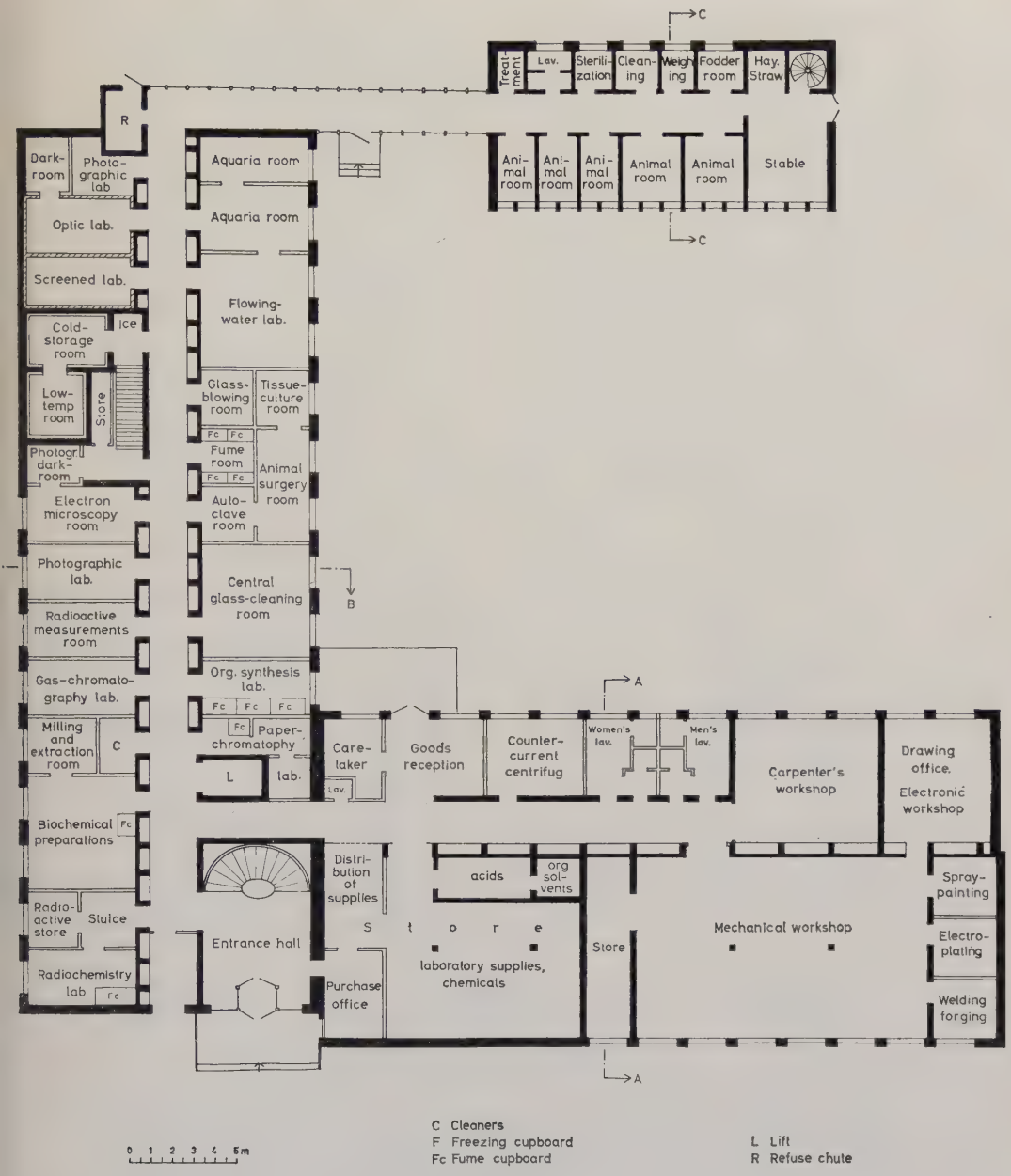


Fig. 7. Plan of ground-floor.

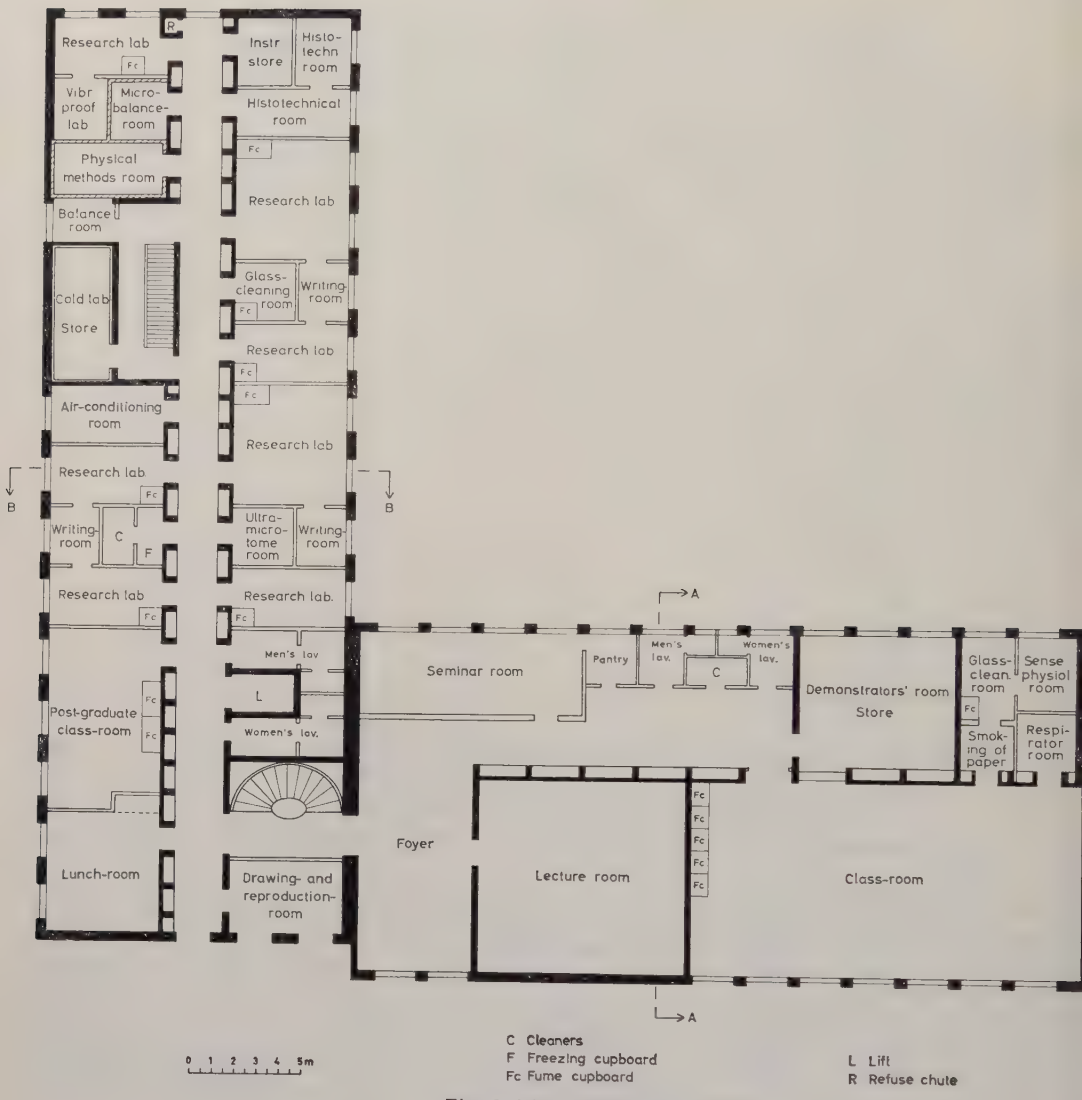


Fig. 8. Plan of first floor.

of the adjacent buildings for the Geographical and Geological Institutes. This is combined with blowing in preheated, fresh air into the rooms and passages. This compensates for the general evacuation and that taking place through the fume-cupboards. These are all provided with separate ducts and fans.

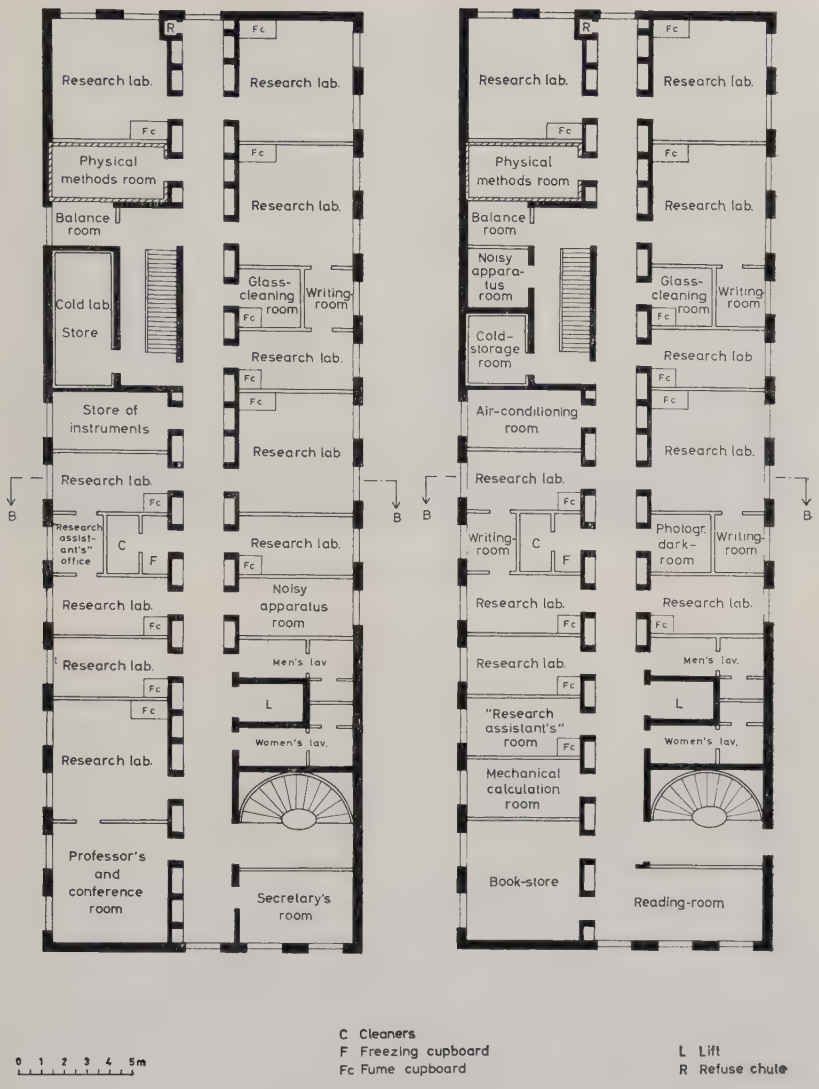


Fig. 9. Plan of second and third floor.

All research laboratories and several rooms for special purposes are provided with tap-water, artificially softened hot water, and distilled water prepared in a room in the attics and distributed to the different rooms through pipes of polyvinylchloride; further with coal-gas, and compressed air (pressure adjustable from 7 kg/cm^2 downwards) from a compressor

Fig. 10. The foyer (No. 252).

in the basement of Block A; ordinary and stabilized alternating current, 220 V, and direct current, 220 V, max. 50 amp, these three kinds of currents being assembled together with three-phase system earth-connections in standardized distribution panels. A small number of rooms are furthermore provided with stabilized direct current, 220 or 440 V, max. 9 amp, and with separate earth-connections.

The evacuating systems like all cables for electricity pass between storeys through channels in the supports of the framed floors, arranged along the passages (cf. Figs. 7—9), and in horizontal direction along the ceiling of the passages, and are thus easily accessible by opening the doors closing the channels against the passages and by removing detachable sections of the ceiling. The cables entering the rooms are supported by ladders along the walls near the ceiling and descend from here to the distribution panels (see e.g. Figs. 17, 21). Pipes for different kinds of water and those for waste, made of acid-proof stoneware, pass vertically through the storeys near the outer walls.

In all research laboratories and several rooms for special purposes wooden "Björnståhl shelves" are mounted along the wall pierced by the windows and one of the transverse walls at a height of 90 cm above the floor. Large rooms are furthermore provided with one or two such shelves running

freely and perpendicularly to one of the walls mentioned. The Björnståhl shelves support the sinks and the taps for water, gas, compressed air and appurtenant pipes. The laboratory tables of the same height are joined to the shelves according to need. There is also a low type of table intended for writing in the laboratories. Both types of tables are provided with interchangeable suspended drawer units. A particularly stable kind of table is further used as support for heavy instruments sensitive to vibrations (Fig. 16). In order to facilitate the attachment of shelves, cupboards, and apparatus to the walls the latter are provided with standardized supporting boards, 150 and 210 cm above the floor (Figs. 16, 17). The free "Björnståhl shelves" are constructed in such a way as to be easily removed, should a large free surface of floor be needed for special experiments.

The laboratory furniture has been designed and the other furniture in the building brought together by Mr. Torgny Wenne under the supervision of the architect, Mr. P. O. Olsson .

SECTION FOR TEACHING

Table 1, for plan, see Fig. 8

The section for teaching was planned for groups of 20 or 40 students, the last-mentioned case implying that two groups of 20 students each use the class-room and the seminar room on alternating days. It is a closed unit which communicates with the main staircase well of Block B by a foyer (No. 252, Fig. 10). Like the class-room this receives the daylight from both sides and extends into a passage. It is decorated with non-figurative art by Mr. Ragnar Sandberg.

The *lecture-room* (No. 270, Fig. 11) being also used for demonstrations, contains 73 seats in steep amphitheatrical arrangement. This was made possible by lowering the floor of the fore part of the room (Fig. 2).

The windows of the lecture room are situated high up on the back-wall, an arrangement providing indirect lighting of the room (Fig. 2). As this appeared very advantageous, the electrical illumination was arranged in a similar way. The front wall is used for the projection of moving pictures and diapositives of different size, the projectors being supplemented by an epidiascope. When needed this wall can be covered with blackboards which are otherwise pulled down behind a covering panel-work. In the lecturer's desk which is shaped as a closed case and fastened to the floor there is a sink with cold and hot water, gas and compressed air, furthermore a panel for electrical operation of the black-out blinds, of the re-

TABLE 1. Block A.

Room No.	Type of room	Area m²
Basement		
061	Telephone installation	5.7
062	Transformer room	35.0
065, 066, 067, 067 A, 068	Shelter	99.0
069	Fish-pools	52.5
Ground-floor		
161	Caretaker	8.0
162	Goods reception	17.0
163	Counter-current centrifuge	17.0
166	Carpenter's workshop	38.0
167	Drawing-office, electronic workskop	28.5
168	Spray-painting room	8.0
169	Electro-plating	8.0
170	Welding, forging	8.0
171	Mechanical workshop	99.0
172	Store	18.0
174	Store (organic solvents)	3.5
175	Store (acids)	9.7
176	Store (laboratory supplies, chemicals)	75.0
176 A	Store and distribution of supplies	12.0
177	Purchase-office	11.5
First floor		
252	Foyer	65.5
261	Seminar room	35.5
261 A	Pantry	5.2
265	Demonstrators' room	39.0
266	Glass cleaning	8.9
266 A	Glass-blowing and smoking of registering paper	6.0
267	Sense physiology	9.0
268	Respirator room	7.0
269	Class-room	147.0
270	Lecture-room	77.5
		954.0 m²

Fig. 11. The lecture-room (No. 270).

Fig. 12. The seminar room (No. 261).

Fig. 13. The class-room (No. 269).

gulation of the intensity of illumination and the amplification of sound, and for the switching of the floodlights illuminating the front wall. This panel also contains connections of a trunk-cable which will be dealt with below, connecting it with the demonstrator's room, the class-room, etc. A corresponding panel is built into the table for the projectors. The lecturer's desk is rather short and is supplemented with movable tables.

The *seminar room* (No. 261, Fig. 12) is furnished with tables and chairs for 22 persons and is provided with blackboards and a projection area as the class-room. The tables may be arranged so as to form a continuous surface. Adjoining to the seminar room is a small *pantry* providing possibilities for the students to have light meals in the seminar room.

The class-room and the demonstrator's room are reached by a passage-like room with 40 clothes-cupboards for the students and adjoining changing-rooms and lavatories.

The *class-room* (No. 269, Fig. 13) is arranged for laboratory work of 20 students working in pairs. Working facilities for these 10 groups are distributed over the room in the form of installations for supply of water, gas, compressed air, electricity, and of sinks, assembled into 5 narrow casings of the same height as the movable laboratory tables adjoined on both sides. Apparatus for common use of the 10 groups is placed on tables

along the northern wall, and the space not occupied by laboratory tables is used for placing bulky apparatus, like thermostats for cell respirometry, cycle ergometer, etc. The class-room is provided with 5 fume-cupboards. It is connected with the adjoining *demonstrator's room* (No. 265) by a broad opening in the wall (to the left in Fig. 13) furnished with shelves and used for distribution of supply. Besides writing-desk and tables for laboratory work the demonstrator's room contains cupboards for the material used in the class-room.

Two small *rooms* are intended for *respirometry* (No. 268) and *sense-physiology* (No. 267). The teaching section is completed by two small technical *rooms,* for *glass-blowing* and *smoking of registering paper* (No. 266 A) and for *glass-cleaning* (No. 266).

The low-voltage trunk-cable mentioned above makes possible the interconnection between the demonstrator's room, the panels of the laboratory tables in the class-room, the panels in the lecture room, and those in the respirator and sense-physiology rooms. All these places may thus be furnished with different kinds of electrical signals from the demonstrator's room; groups of students co-operating in the same experiment may further be connected by telephone, etc.

SECTION FOR RESEARCH AND RESEARCH-TRAINING

Table 2, for plans, see Figs. 7–9

This section is chiefly made up by research laboratories, writing-rooms, and rooms for special purposes common to all research workers.

Research laboratories and writing-rooms

The *research laboratories* are of two sizes, 13.1 and 26.8 m^2 (Fig. 14), respectively, all provided with fume-cupboards. Adjoining some of the research laboratories are 8 small *writing-rooms* with an area of 5.7 m^2. The only writing-room of a larger size is that of the professor on the second floor (No. 312) with an area of 26.5 m^2, used also for meetings. These small writing-rooms are combined with research laboratories in three different ways: (1) The writing-room and a large research laboratory form a unit intended in the first instance for teaching docents, lecturers etc. (2) The writing-room is situated between a large and a small research laboratory, or (3), between two small ones and may in either case be used by one or two persons.

Table 2. Block B.

Room No.	Type of room	Area m^2
Ground floor		
101	Entrance hall	27.5
111	Radiochemistry laboratory	13.0
112	Sluice	4.0
112 A	Radioactive store room	7.6
114	Laboratory for biochemical preparations	26.0
115 A	Milling and extraction room	9.0
116	Gas-chromatography laboratory	13.0
117	Room for radioactive measurements	13.0
118	Photographic laboratory	13.0
119	Electron microscopy room	13.0
120	Photographic dark-room	5.2
121 A	Low-temperature room (−20°C)	6.2
122	Ice-machine	4.3
122 A	Cold-storage room (+1°C)	10.4
123	Screened laboratory	11.3
124	Optic laboratory	12.7
125	Photographic dark-room	6.5
125 A	Photographic laboratory	5.0
126	Aquaria room	11.0
127	Aquaria room	13.5
128	Flowing-water laboratory	30.0
130	Glass-blowing room	4.5
130 A	Tissue-culture room	5.1
131	Fume-room	6.6
132	Autoclave room	5.8
132 A	Animal surgery room	13.9
134	Central glass-cleaning room	26.5
135	Organic synthesis laboratory	13.0
136	Paper-chromatography laboratory	4.5
136 A	Paper-chromatography laboratory	4.2
136 B	Paper-chromatography laboratory	3.7
First floor		
212	Lunch room	28.9
215	Post-graduate class-room	38.6
216	Research laboratory	13.0
217 B	Writing-room	5.7
218	Research laboratory	13.0
220	Cold laboratory and storage (+1°C)	13.2
222	Balance room	5.5
223	Physical methods room	11.0

TABLE 2 (*continued*).

Room No.	Type of room	Area m^2
224	Micro-balance room	6.5
224 A	Vibration-proof laboratory	6.6
225	Research laboratory	12.5
226	Store of instruments	7.2
226 A	Histotechnical room	7.2
227	Histotechnical room	11.0
229	Research laboratory	26.5
230	Glass-cleaning room	6.8
230 A	Writing-room	5.7
231	Research laboratory	13.0
233	Research laboratory	26.5
234	Ultramicrotome room	7.0
234 A	Writing-room	5.7
235	Research laboratory	13.0
240	Drawing- and reproduction-room	17.0
Second floor		
312	Professor's and conference room	26.5
313	Research laboratory	26.5
315	Research laboratory	13.0
316	Research laboratory	13.0
317 B	"Research assistant's" office	5.7
318	Research laboratory	13.0
319	Store of instruments	13.0
320	Cold laboratory and storage (+1°C)	13.2
322	Balance room	5.5
323	Physical-methods room	11.0
324	Research laboratory	26.5
327	Research laboratory	26.5
329	Research laboratory	26.5
330	Glass-cleaning room	6.8
330 A	Writing-room	5.7
331	Research laboratory	13.0
333	Research laboratory	26.5
334	Research laboratory	13.0
335	Noisy-apparatus room	13.0
340	Secretary's room	16.0
Third floor		
412	Book-store	26.5
413	Mechanical calculation room	13.0
414	"Research assistant's" room	13.0

TABLE 2 (*continued*).

Room No.	Type of room	Area m²
415	Research laboratory	13.0
416	Research laboratory	13.0
417 B	Writing-room	5.7
418	Research laboratory	13.0
420	Cold-storage room (+1°C)	7.0
421	Noisy apparatus	7.0
422	Balance-room	5.5
423	Physical-methods room	11.5
424	Research laboratory	26.5
427	Research laboratory	26.5
429	Research laboratory	26.5
430	Glass-cleaning room	6.8
430 A	Writing-room	5.7
431	Research laboratory	13.0
433	Research laboratory	26.5
434	Photographic dark-room	6.2
434 A	Writing-room	5.7
435	Research laboratory	13.0
440	Reading-room	25.0
		1267.6 m²

The post-graduate class-rom (No. 215, Fig. 15) which is furnished in the same way as the research laboratories is situated on the first floor. It has accommodations for 6 students, and is used for research between courses.

Special laboratories and technical rooms

The research laboratories are distributed among three floors. Each of these is provided with a number of standardized facilities, balance room, rooms for glass-cleaning, for noisy apparatus, for physical measurements, freezing-box, and cold storage or cold laboratory. By this arrangement the research work is considerably facilitated and much time saved as it permits immidiate access to certain utilities whenever needed. There is also a number of small photographic dark-rooms. However, these are located on the ground-floor and the third floor.

The short passage intended for communication with a future enlargement of the building and adjoining the wall of the vibration-proof part is adopted

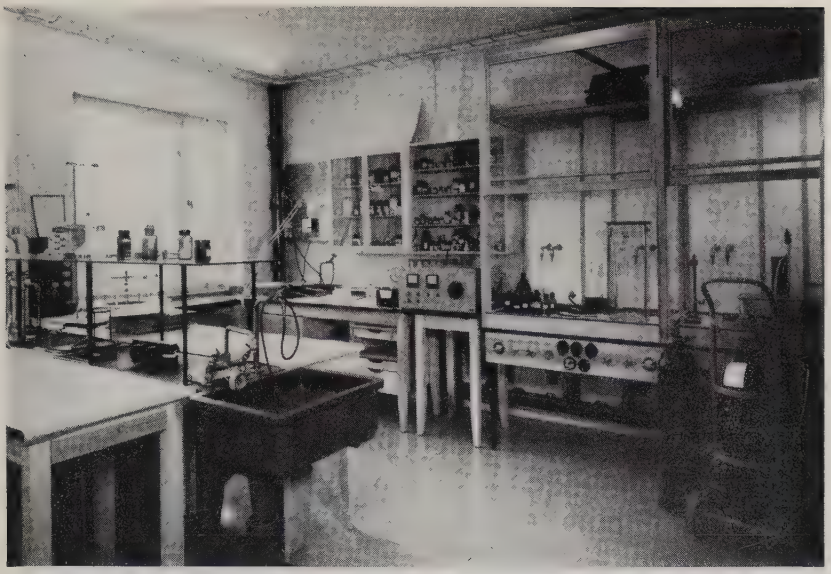


Fig. 14. Research laboratory (No. 313).

as *balance-room* on the first (No. 222) and second (No. 322) floors as is the corresponding space on the third floor (No. 422). The supports for the balances, a semi-micro and a precision balance (Mettler) in each room, are mounted on the vibration-proof wall. Further, a special *room for micro-*

Fig. 15. The post-graduate class-room (No. 215).

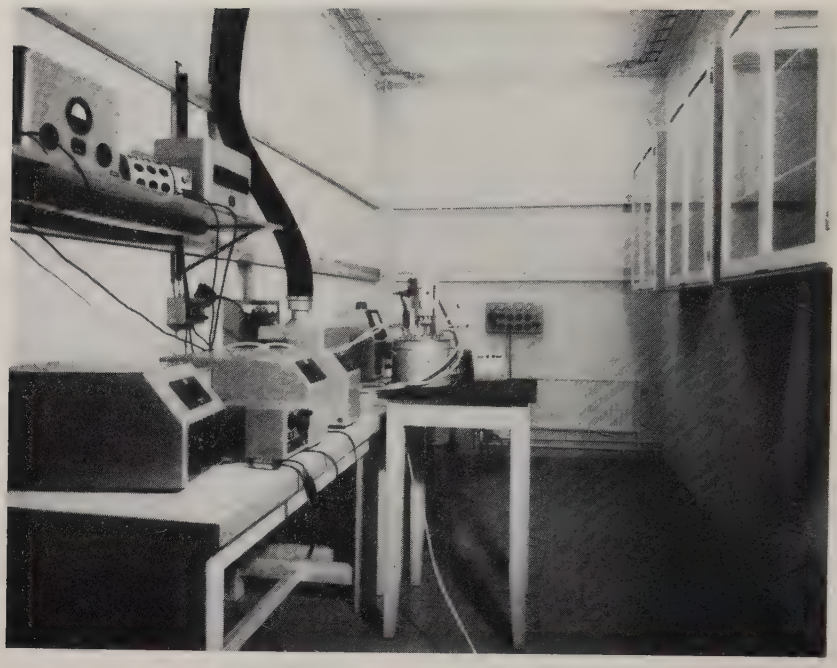


Fig. 16. Room for physical methods (No. 223).

balances (No. 224 A) is included in the vibration-proof part of the building (first floor).

Also the *rooms for physical methods* (Nos. 223, 323, 423) are placed in this part (Fig. 16). They are so far equipped with pH-meters and spectrometers, a Zeiss Spectroflurometer with Xenon lamp and two monochromators, a Beckman DK2 and, finally, a Zeiss PMQ II.

There are special *rooms for noisy apparatus* (Nos. 335, 421) on the second and third floors only (Fig. 17). For the first floor this function had unfortunately to be allotted to the post-graduate class-room. At present shakers of different types and bulky centrifuges are assembled in these rooms, the centrifuges being represented by a Wifug, type X 3, an International, Model PR-2, a MSE High-speed 17, and a MSE High-speed 18.

The small *rooms for glass-cleaning* (Nos. 230, 330, 430) offer to the individual research worker the possibility to clean specimens of glass himself which are expensive or the cleanness of which is of special importance for the success of experiments. Other laboratory glass is handled in the *room for central glass-cleaning* (No. 134) on the ground floor.

Fig. 17. Room for noisy apparatus (No. 335).

Cold storage and *cold laboratories* are adjusted to a temperature of $+1 \pm 0.5$°C. The cold storages have an area of 6.9 m^2 and are located on the ground floor (No. 122 A) and on the third floor (No. 420). The cold laboratories on the first floor (No. 220) and the second floor (No. 320) with an area of 13.2 m^2 provide besides shelves for storing also ample space for laboratory work or for experimental set-up.

Most of the rooms for special purposes are assembled on the ground-floor. However, two *rooms*—one of them rather small—*for histotechnics* (Nos. 226 A, 227) and a small *ultramicrotome room* (No. 234 A) are situated on the first floor. The two first-mentioned rooms are provided with a freeze-drying apparatus, constructed and built within the Institute, and with various thermostats and microtomes; the third room is equipped with a LKB Ultrotome. A *room for electronmicroscopy* (No. 119), provided with an Akashi microscope TRS-50 E 1, is located on the ground-floor together with an adjoining small *photographic dark-room* (No. 120).

Three *rooms* on the ground-floor adjoining each other are specially equipped for studies on aquatic animals. Two of these are intended for *aquaria* (Nos. 126, 127) and are accordingly provided with shelves and with numerous supplies of water (Fig. 18). One of them is intended for tropical and subtropical animals, the other for animals from temperate

Fig. 18. Room for aquaria (No. 127).

climates. The third room, the *flowing-water laboratory* (No. 128, Fig. 19) has arrangements which make possible the intake and discharge of great volumes per minute of water, providing comparatively high rates of flow in troughs. Here are mounted two specimens of an apparatus, called fluviarium, constructed and built within the Institute and used for the study of reactions of aquatic animals against gradients of chemical substances (Fig. 19).

These three rooms which are provided with a special supply of compressed air from a membrane pump are complemented with six fish-pools (room No. 069 in the basement of Block A, Fig. 20) for keeping of fish during the winter, each holding about 1.0 m^3 and provided with arrangements for aeration and circulation of the water (Fig. 20). Here the ordinary compressed air is used for aeration after being filtered twice. The *room for animal surgery* (No. 132 A) together with the *autoclave room* (No. 132) and the *tissue-culture room* (No. 130 A) constitute another unit concerned directly with the living material.

Fig. 19. The flowing-water laboratory (No. 128).

Fig. 20. Fish-pools in room No. 069.

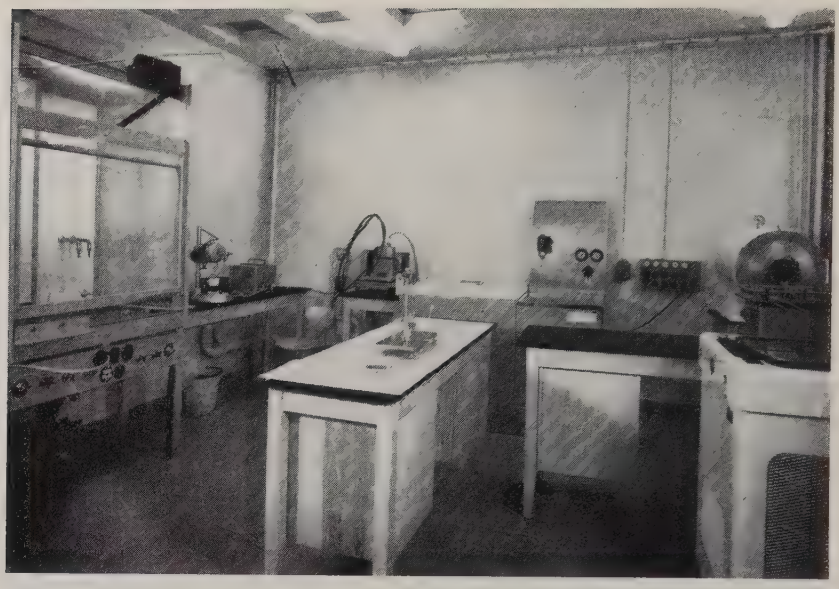


Fig. 21. The laboratory for biochemical preparations (No. 114).

A special room was intended for measurements influenced by electrical disturbances and more specially for electrophysiology. This *screened laboratory* (No. 123) at present also contains a celloscope (Ljungberg) which apparatus is preferably operated here. Some lines of research going on in the old premises indicated the need of a dark-room for animal experimentation. Such a room was accordingly planned. This room provided with a small *photographic dark-room* (No. 125), has, however, changed its character into that of an *optical laboratory* (No. 124), at present furnished with a Zeiss Ultraphot II and a Tiselius Electrophoresis Apparatus, Perkin-Elmer, Model 38 A.

Some rooms have been adopted for different kinds of chemical work: A *laboratory for organic synthesis* (No. 135) has been furnished with great fume-cupboards which are very efficiently ventilated.

In the *laboratory for biochemical preparations* (No. 114, Fig. 21) a number of openings have been made in the ceiling piercing the floor of the post-graduate class-room (Fig. 15). This makes possible the setting up of columns and other apparatus through two storeys. When not in use the openings are closed by lids. In this preparative room the most important apparatus are a preparative ultra-centrifuge, MSE Super-speed 40, a freeze-

Fig. 22. Room for radioactive measurements (No. 117).

drying apparatus for preparative work, and an ultra-sound generator. In the adjoining small room (No. 115 A) a number of apparatus for cutting, grinding, chopping etc., and for shaking and extraction is used. Special *laboratories* are also provided for *paper-chromatography* (Nos. 136, 136 A, 136 B) and *gas-chromatography* (No. 116).

The *radioactive store-room* (No. 112 A) and the *radiochemistry laboratory* (No. 111) with their common *sluice* (No. 112) are intended for storage and handling of activities of the order of magnitude of mC. The store-room is furnished with a vertical concrete well armed with iron ore and penetrating the floor. The samples may be lowered into this with a small hand-driven lift. The *room for radioactive measurements* (No. 117, Fig. 22) is provided with a liquid Scintillation Counter, Ekco 664 B, with Scaler, Ekco N 610 A, a "Strahlungsmessgerät", Friesecke & Höpfer, FH 49, with Automatic Sample Changer, FH 516, a Radiochromotogram Scanner, FH 452, and with a Monitor FH 55.

A *low-temperature room* (No. 121 A) with a temperature of $-20 \pm 1°C$ is large enough to allow experimental work in addition to storage. The adjoining cold-storage, already mentioned above, is used also for keeping a large number of frogs or toads during the winter.

Fig. 23. The reading-room (No. 440).

Miscellaneous rooms

Two small rooms (Nos. 226, 319) with a combined surface of 20.3 m^2 are used as *stores of instruments*. This space has, however, proved too small. The instrument park of the Institute is superintended from the *"research assistant's" office* (No. 317 B) on the second floor. Also the *secretary's room* (No. 340) is situated here opposite that of the professor (No. 312). In the *drawing- and reproduction-room* (No. 240) which is furnished with a tracing desk with transmitted light, a reproduction apparatus, Leitz Reprovit, and a camera, Linhof Color 9 × 12 cm, the illustration-material for the teaching and the publishing activity is produced. The implied treatment of photographic negatives is made in the *photographic laboratory* (No. 118) on the ground-floor.

Reprints of the Institute's own publications are stored in steel cupboards placed on the landing of the third store of the main staircase well.

The library, composed of a book-store and a reading-room, is situated on the third floor. In the *book-store* (No. 412) periodicals, textbooks, and hand-books are arranged in open shelves, whereas a collection of reprints is stored in locked cupboards. All new acquisitions are exposed in the *reading-room* (No. 440, Fig. 23), where the issues of the current year of

the periodicals are kept in a cupboard of Norwegian origin, the very latest issues being exposed to the visitor.

Nearest to the book-stores is the *room for mechanical calculations* (No. 413) with a number of calculation machines for common use. Some typewriters are also set up here. The wall separating this room from the book-store has been left free of pipes and can easily be removed, when enlargement of the book-store becomes necessary.

The *lunch-room* (No. 212) which is provided with a pantry and 24 seats is intended for research workers and employees. It is also used as a meeting-room.

CENTRAL STORES

Table 1, for plan, see Fig. 7

The space below the lecture-room, the height of which is partly reduced, is exploited for central stores. This large *room* (No. 176) is used *for laboratory supplies and chemicals*. Special small rooms have been divided off as *stores for organic solvents* (No. 174) and *for acids* (No. 175), both being well ventilated. The first-mentioned room was cast in concrete in order to withstand explosions. The supplies are distributed from room No. 176 A (*Distribution of supplies*), where also certain articles are stored. A *purchase-office* (No. 177) is included in the central stores.

WORKSHOPS

Table 1, for plan, see Fig. 7

The workshops are equipped for mechanical work, wood-work, and electronic work. Because of lack of personnel trained in glass-blowing, this kind of work must at present either be sent out or performed by the research people. For this purpose a small *room for glass-blowing* (No. 130) has been set up on the ground-floor of Block B.

The *mechanical workshop* (No. 171. Fig. 24) has been furnished with auxiliary *rooms for storage* (No. 172), *spray-painting* (No. 168), *electro-plating* (No. 169), *welding and forging* (No. 170). Another adjoining room (No. 167, Fig. 25) is used by the instrument-maker as a *drawing-office,* and serves at the same time as *electronic workshop.* This is not a quite ideal arrangement. The *carpenter's workshop* (No. 166) is quite separated from the mentioned premises. Each of the workshops is provided with an equipment permitting the performance of almost all kinds of processes belonging to its line.

Fig. 24. The mechanical workshop (No. 171).

Fig. 25. The drawing-office and electronic workshop (No. 167).

Fig. 26. Animal room (No. 197, small type).

Fig. 27. Animal room (No. 196, large type).

A special apparatus, a *counter-current centrifuge,* developed within the Institute and still the object of improvements, is placed near the workshops in room No. 163.

ANIMAL SECTION

Table 3, for plans see Figs. 6–7

The animal section is contained in Block C, consisting of basement, ground-floor and attics. The latter is used as store of cages, hay, and straw. On the ground-floor there are on the northern side of a passage *animal rooms* (Nos. 159–199) of two sizes, 5.8 and 9.0 m^2, respectively (Figs. 26–27), and *rooms for fodder* (No. 191), for *weighing of animals* (No. 190), for *sterilization* and *cleaning of cages* (Nos. 188–189), for *routine treatment of animals* (No. 186), etc. on the opposite side. The passage leads into a *stable* (No. 194) having room for two horses or cows or several small animals as e. g. sheep. The manure is evacuated from all rooms containing animals by flushing water through a conduit in the floor of the

Table 3. Block C.

Room No.	Type of room	Area m^2
Basement		
086	Storage room	44.8
First floor		
186	Routine treatment of animals	2.1
188	Sterilization of cages	3.3
189	Cleaning of cages	4.8
190	Weighing of animals	3.3
191	Fodder room	3.3
192	Hay and straw	3.6
194	Stable	19.0
195	Animal room	9.0
196	Animal room	9.0
197	Animal room	5.8
198	Animal room	5.8
199	Animal room	5.8
		119.6 m^2

passage, and is after treatment in a mill in room No. 087 in the basement discharged into the sewer.

The basement contains a large room (No. 086) intended as a store. As there are intentions of laying out part of the grounds near the Institute as a lawn, the provisional animal house mentioned above (p. 5) may have to disappear. In this case room No. 086 will be used as an *animal room* (rats).

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